2nd Conference on Life Cycle Assessment of waste –
Integrated Residual Resource Management and Assessment
18th - 22nd June 2018

Sustainability analysis: local to global impacts in the urban waste management sector

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Ghent University

Grant Agreement No.: 688920 **REPAiR - REsource Management in Peri-urban AReas**

Horizon 2020 REPAIR project

REsource Management in Peri-urban Areas: Going Beyond Urban Metabolism

Objective

To develop, test and implement a geodesign decision support environment (GDSE) for the development of integrative spatial development strategies that understand waste and related treatment processes as a resource.

REPAiR

Consortium and living labs

Participant (Acronym)	Country
Delft University of Technology (TUD)	NL
Ghent University (UG)	BE
DiARC UNINA - University of Naples Federico II (UNINA)	I
HafenCity Universität Hamburg (HCU)	D
Institute for Regional Studies, CERS of HAS, MTA KRTK (RKI)	H
Institute of Geography and Spatial Organization Polish Academy of Sciences (IGiPZ)	PL
Joint Research Centre (JRC)	I
Geo-Col GIS and Collaborative Planning (Geo-Col)	NL
Delta Development Group (DELTA)	NL
BIOKOM Nonprofit Ltd (BIOKOM)	H
Gertz Gutsche Rümenapp Stadtentwicklung und Mobilität GbR (GGR)	D
OVAM - Public Waste Agency of Flanders (OVAM)	BE
Municipality of Haarlemmermeer (GHM)	NL
Campania Regional Authority (CRA)	I
Pheno horizon (PHH)	PL
Bauer Umwelt GmbH (BMU)	D/I
IVAGO (IVAGO)	BE
Stadtreinigung Hamburg (SRH)	D

REPAiR

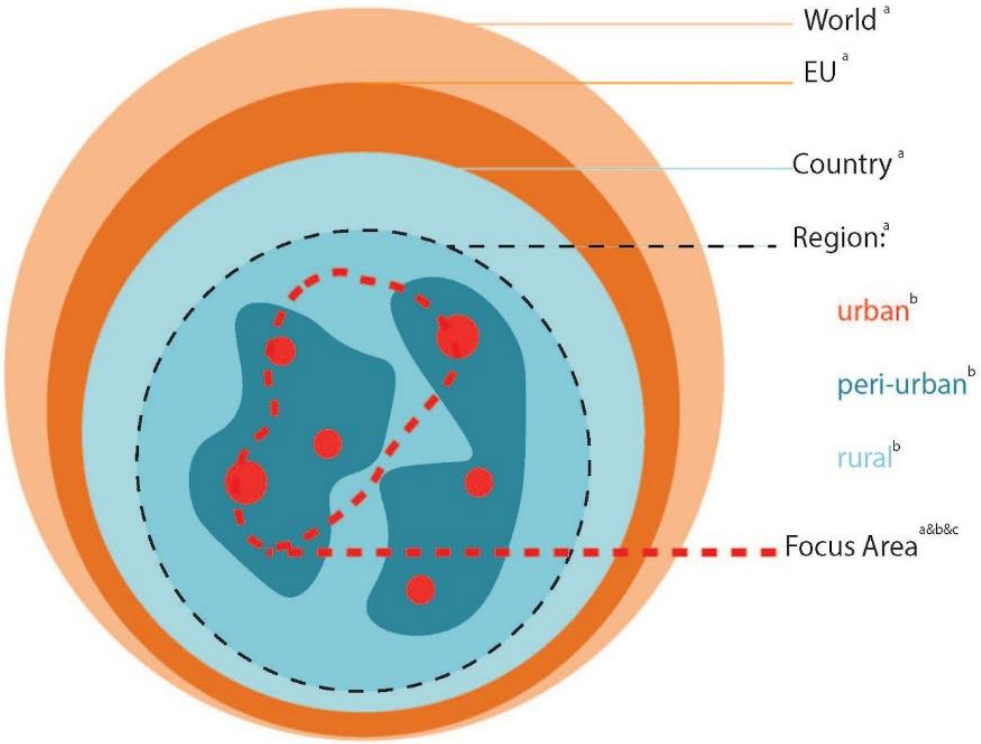
Waste types

REPAIR WASTE CATEGORIES	REPAIR CASE STUDY AREAS					
	Amsterdam	Napels	Ghent	Pécs	Lódz	Hamburg
Construction & demolition waste						
Organic waste						
Post consumer plastic waste						
Municipal solid waste						
Wastescapes						

- Current situation
- Eco-innovative solutions

REPAiR

Geographical boundaries



[a] Areas based on administrative boundaries
[b] Areas based on demographic and land cover data
[c] Areas based on qualitative assessment

Sustainability assessment

Goal Development of a comprehensive sustainability framework for urban waste management and circular economy approaches and apply it to the case study areas

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Functional Unit The treatment of waste (A) as it is generated by (B) in the focus area during one year

(A) the type of waste (e.g., food waste as the key flow)

(B) the waste generator(s) in the focus area (e.g., households, SMEs, etc.)

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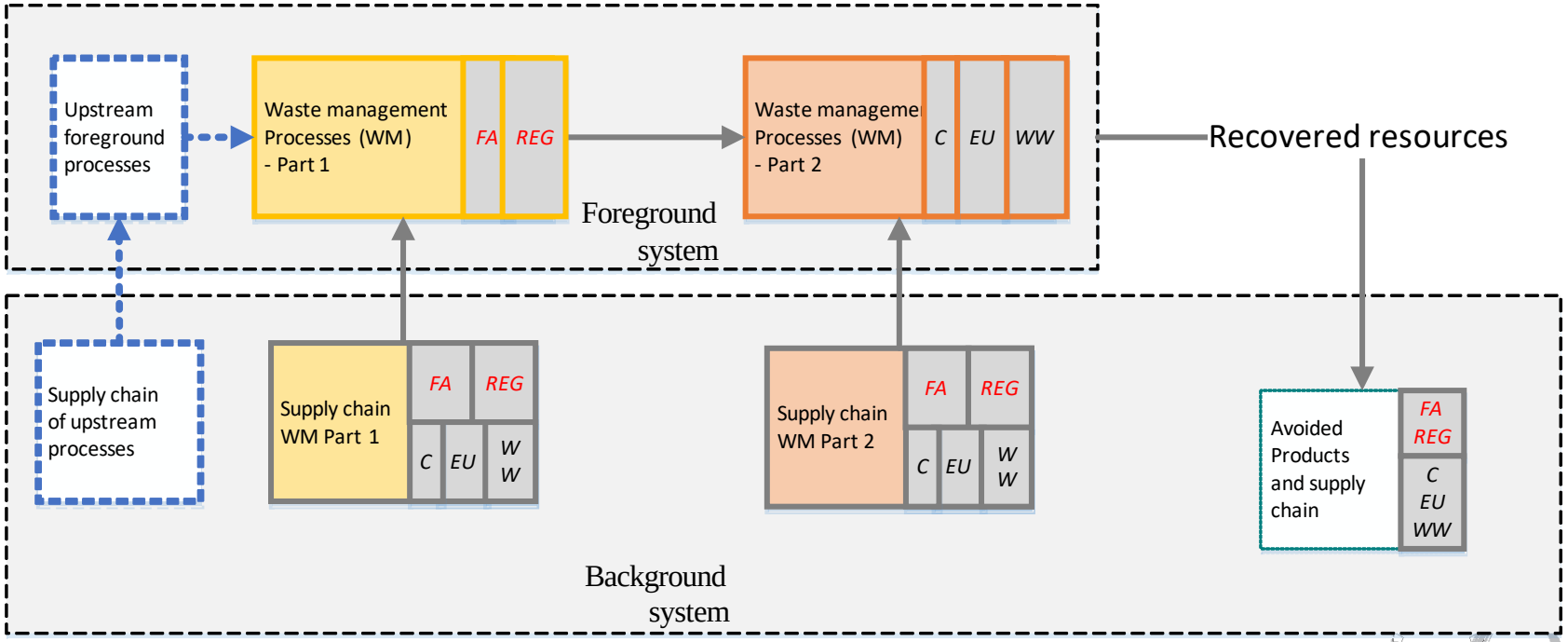
System Boundaries



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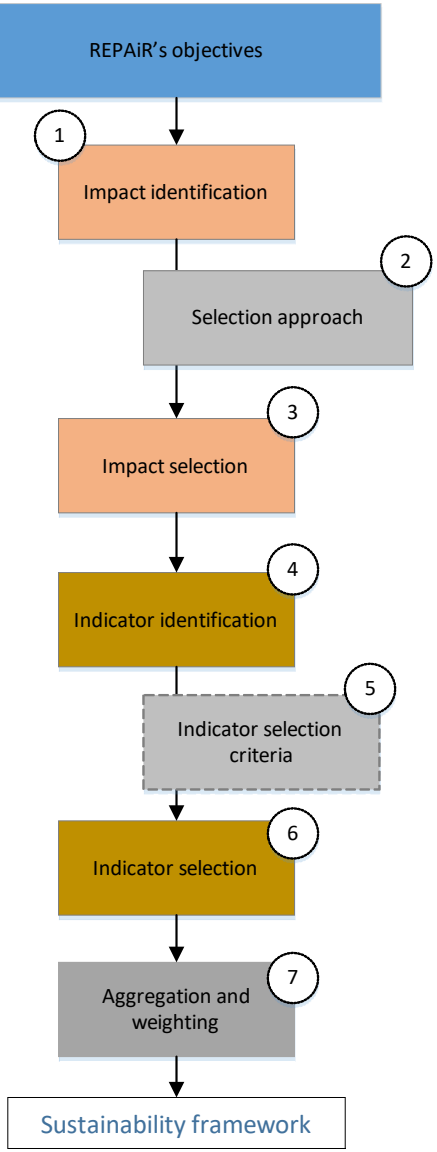
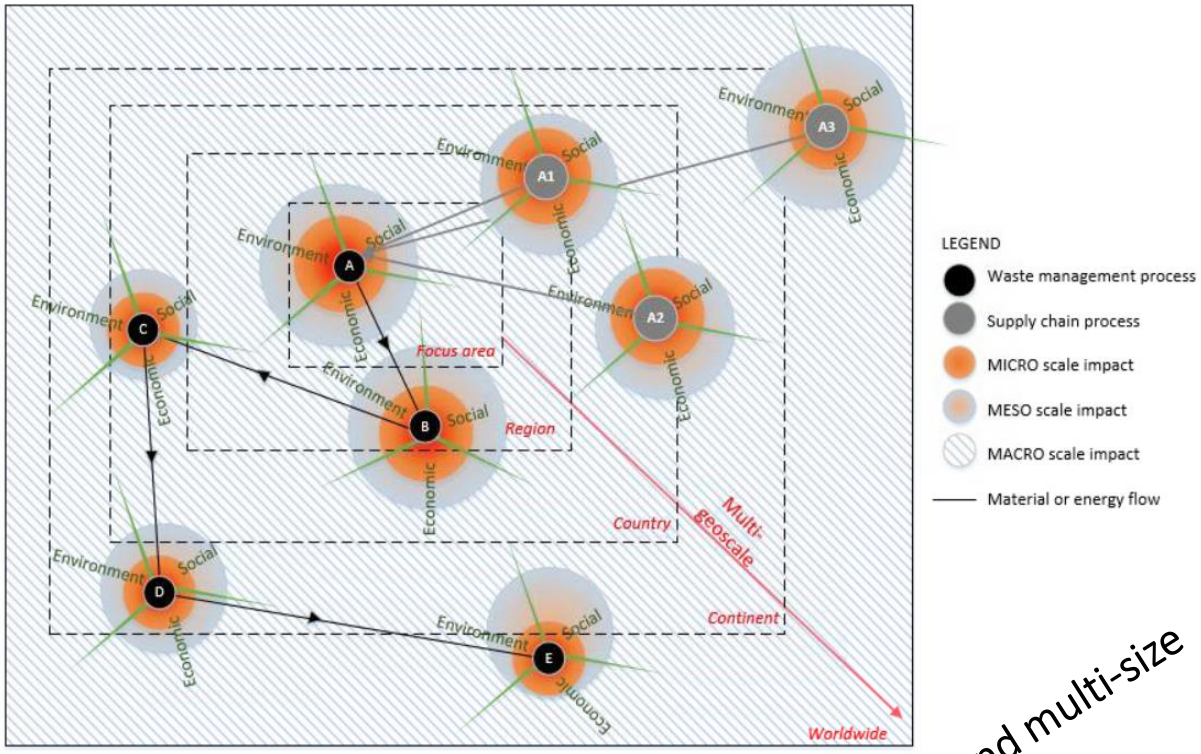
Sustainability assessment

Methodology



Sustainability assessment

1 *Impact identification*



Transdisciplinary

Multi-scale and multi-size

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Sustainability assessment

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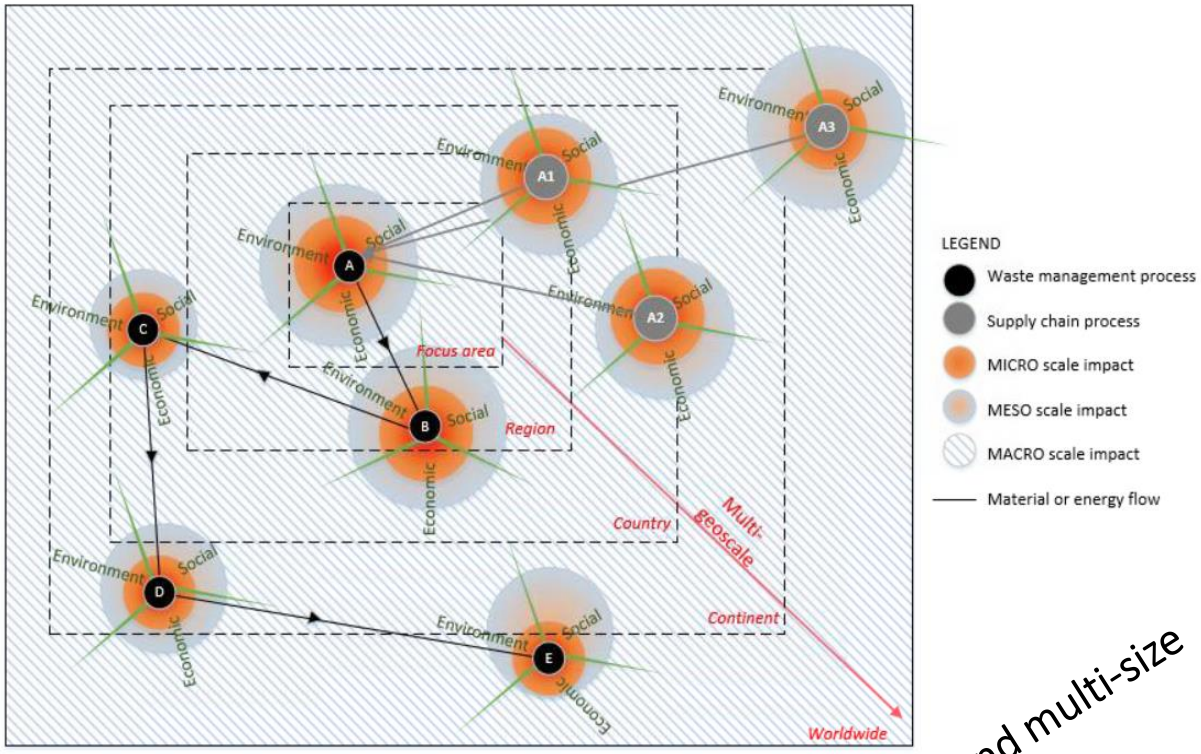

Multi-scale and multi-size

Transdisciplinary

→ List of transdisciplinary impacts

1) literature, 2) expertise of partners

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Sustainability assessment

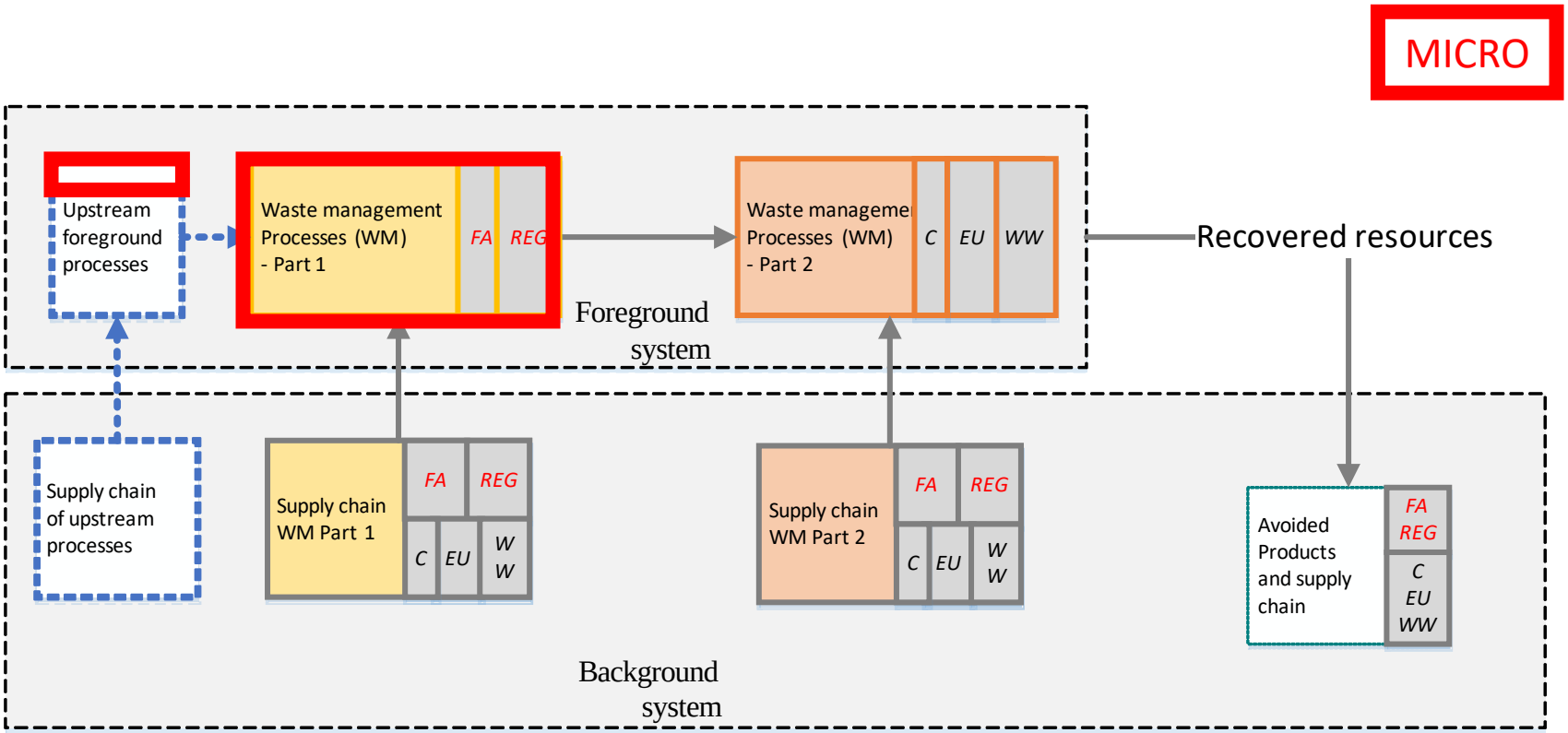
2 3 *Selection approach + impact selection*

Multi-scale and multi-size impacts: data-availability (e.g., databases, case studies)

Transdisciplinary impacts: relevance, interest by consortium

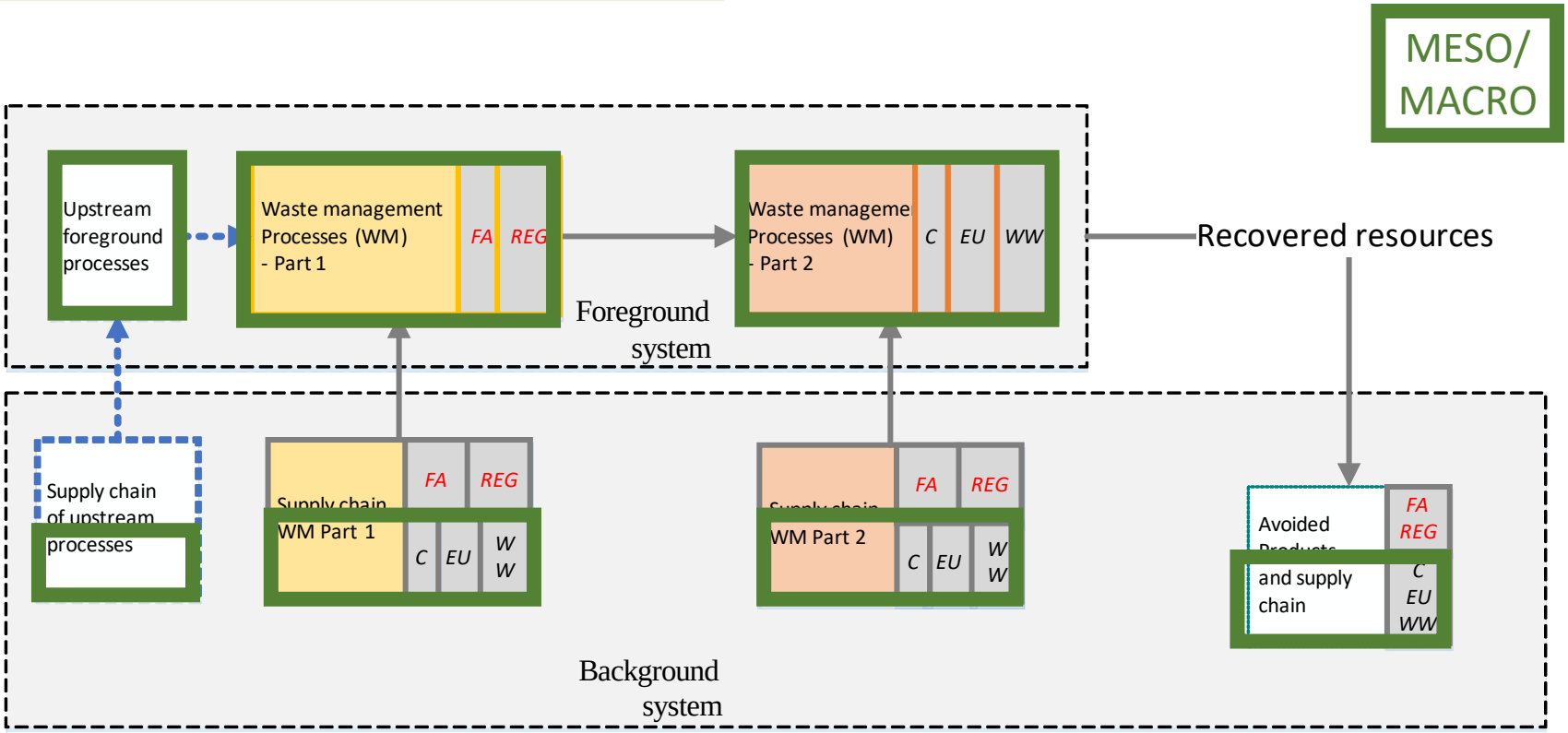
Sustainability assessment

Multi-scale and multi-size impacts



Sustainability assessment

Multi-scale and multi-size impacts



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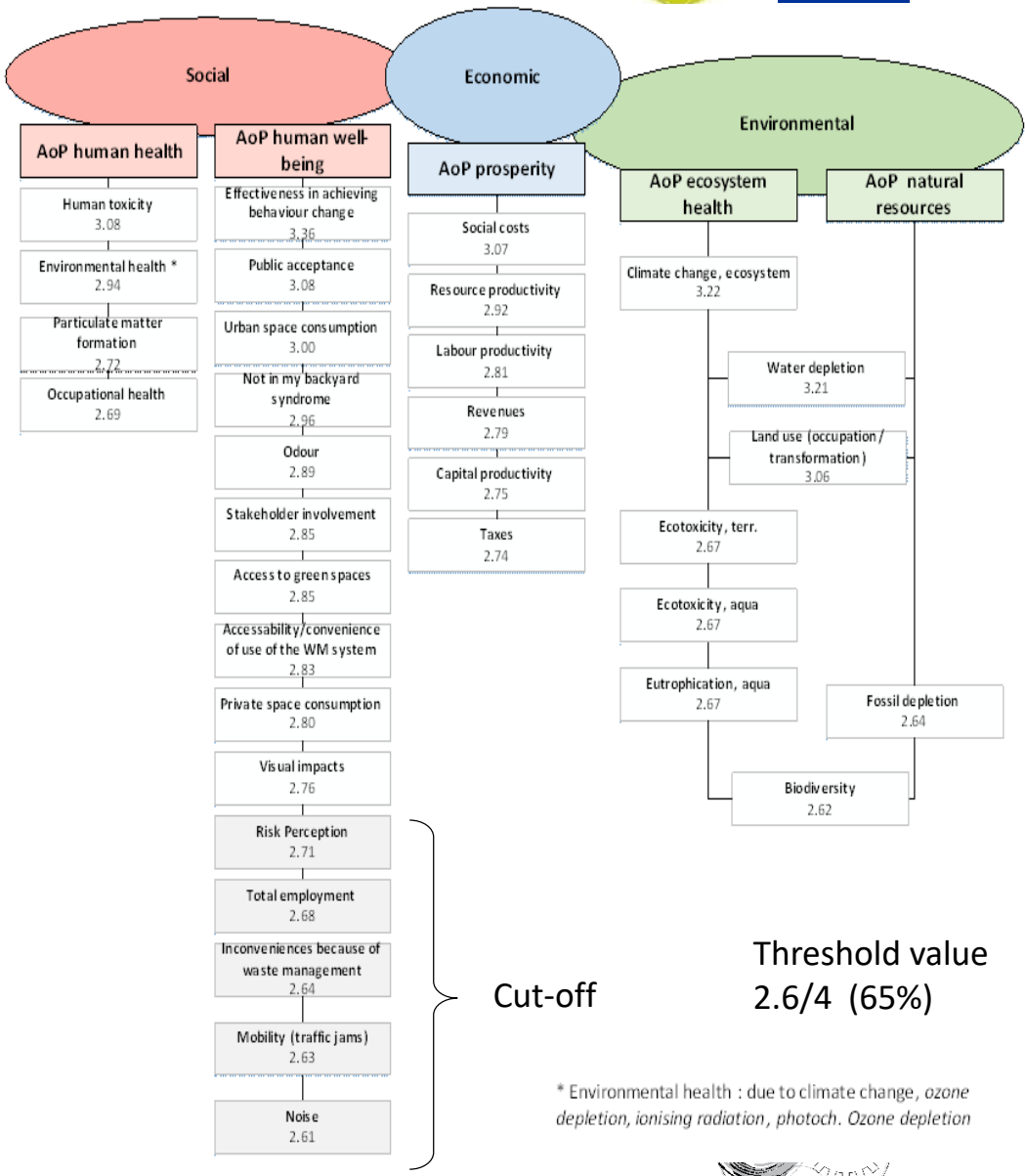
Sustainability assessment

Transdisciplinary impacts

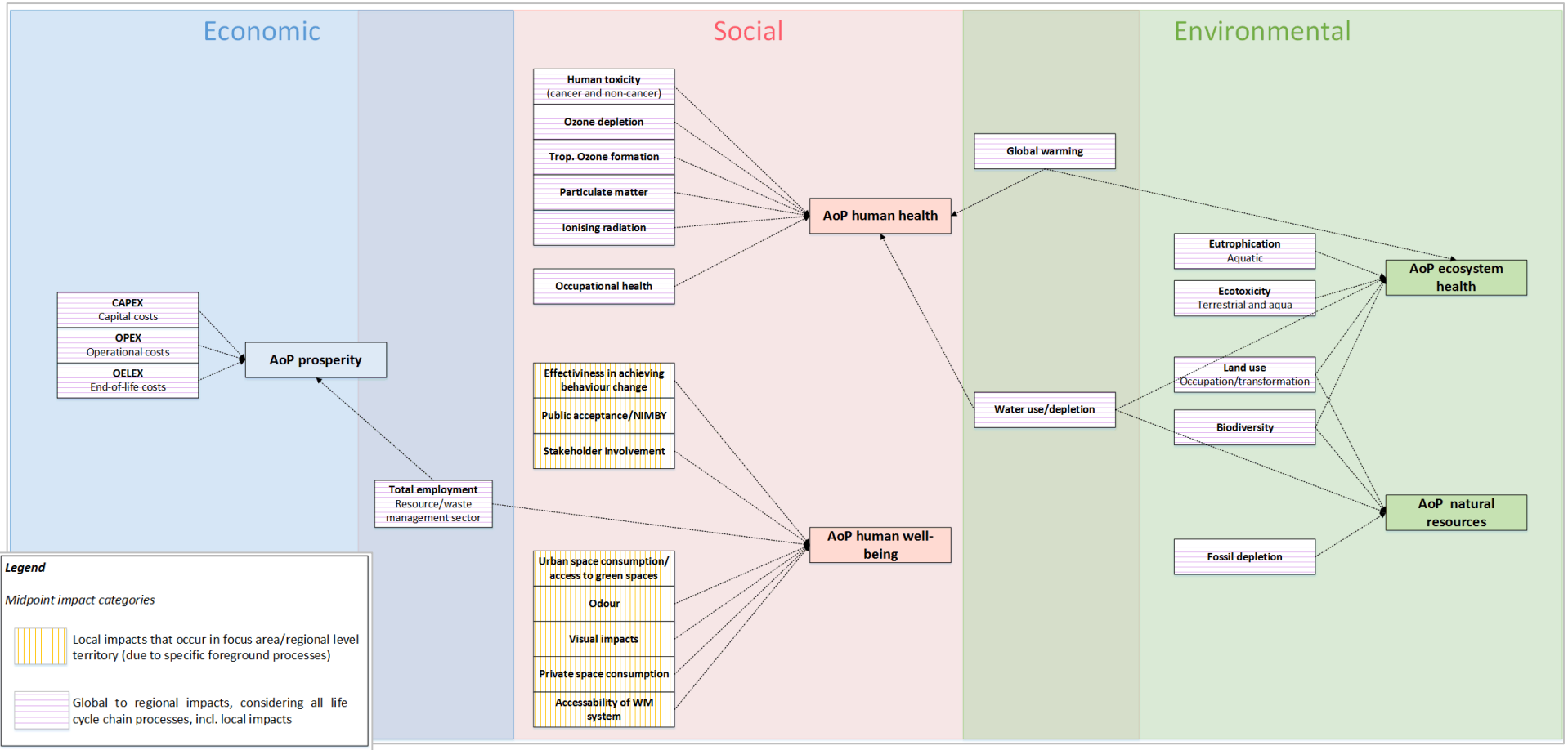
PARTNER GROUP / LOCATION	local/regional authority	Scientific institution	waste treatment company	SUM
Amsterdam	3	3	3	**9**
Ghent	3	3	3	**9**
Hamburg	3	3	3	**9**
Lodz	3	3	3	**9**
Naples	3	3	3	**9**
Pecs	3	3	3	**9**
SUM	**18**	**18**	**18**	**54**



Sustainability assessment

Transdisciplinary impacts

Expert panel debate



Sustainability assessment

4 *Indicator identification*

Literature review!!

5 *Selection criteria*

SCORE	Feasibility (implementation)	Relevance (ability to assess the impact of interest)	Easiness to interpret (by policy makers)	Achievability (in terms of data collection and time window)
4	Connected to LCA/background databases and cause-effect relation	Excellent	Very straightforward	Very straightforward
3	Cause-effect relation but not connected to LCA/background databases	Good	Quite easy	Quite easy
2	Data available for establishing cause-effect relation	Poor	Rather difficult	Rather difficult
1	No cause - effect chain identified	Bad	Almost impossible	Almost impossible

- When an indicator scores <2 on one or more criteria → indicator not retained
- The indicators must score at least >= 3 for two criteria to be considered relevant
- The indicator with the highest score per impact category will be selected

Sustainability assessment

6 *Indicator selection*

Indicators for the micro impact categories

Ongoing work
indicators for other categories and aggregation techniques per AoP 6 7

Deliverables due date:
31st of August 2018

IMPACT CATEGORY	INDICATOR	FEASIBILITY	RELEVANCE	EASINESS TO INTERPRET	ACHIEVABILITY	*Average*
A "Effectiveness in achieving behaviour change"	**A1: : Change in (MSW) Selective collection behaviour**	2	2	4	3	**2,75**
	A2: Composit indicator about waste/environmental conscious actions	2	3	3	2	2,50
	A3: Company related behaviour	2	1	4	3	~~2,50~~
B "Public acceptance/NIMBY syndrome"	**B1: Cost-effectiveness for residents resulting from waste segregation**	2	2	4	3	**2,75**
	B2: Societal awareness	2	3	2	2	2,25
	B3:"NIMBYst" profile indicator	2	3	2	2	2,25
	B4: Spatial conflicts intensity indicators	1	2	3	1	~~1,75~~
	B5: Municipal budget waste management expenditure indicator	2	1	4	3	~~2,5~~
C "Stakeholder involvement"	C1: Voter turnout	2	1	3	4	~~2,50~~
	C2: Stakeholder engagement for developing regulations	1	2	2	3	~~2,00~~
	C3: Stakeholders' satisfaction with the process of participation	2	3	3	1	~~2,25~~
	C4: The Social capital	1	2	2	2	~~1,75~~
	C5: Stakeholders' engagement in the project activities (workshops, monitoring and planning processes, etc.)	2	2	4	2	**2,50**
	C6: The effectiveness of the public participation exercise	2	2	2	2	2,00
D "Urban space consumption/access to green spaces"	D1: Distance to and coverage of urban green spaces and wasted landscapes	3	4	3	2	3,00
	D2: Urban space consumption of the waste treatment system (operational infrastructure of waste)	2	4	4	4	**3,50**
	D3: Spatial efficiency of the waste treatment system (operational infrastructure of waste)	2	2	3	3	2,50
	D4: Landscape fragmentation	2	2	3	3	2,50
E "Odour"	**E1: Odour footprint**	4	3	4	2	**3,25**
	E2: Odour impacts in LCA	2	3	4	1	~~2,50~~
	E3: Variation of property value as a result of a project - odour	3	3	4	2	3,00
F "Landscape Disamenities, cfr. Visual impacts"	**F1: Variation of property value as a result of a project - landscape**	3	3	4	2	**3,00**
	F2: Willingness To Pay (WTP)	2	3	4	1	~~2,5~~
G "Private space consumption"	**G1: Private space consumption of the waste treatment system**	2	4	4	2	**3,00**
	G2: Share of high-quality land in built-up areas (private properties built by housing and/or outbuildings)	1	2	3	3	~~2,25~~
	G3: Spatial capacity of private areas for waste management	1	2	3	3	~~2,25~~
	G4: Mean share of area designated for waste storage on privately-owned property in the total area of property	2	2	3	2	2,25
H "Accessibility of WM system"	H1: Time-use for waste sorting	2	3	3	2	2,50
	H2: Willingness to pay for others handling the sorting	2	3	3	2	2,50
	H3: Percentage of doorways attending to the distance of waste collection points	2	3	4	2	**2,75**

THANK YOU!

Contacts and Further Information

LEAD Partner:
Delft University of Technology
Faculty of Architecture and the Built Environment
Department of Urbanism – Chair of Environmental Technology and Design

- **Principle Investigator:** Prof. Dr. Arjan van Timmeren
- **Scientific Project Management:** DI Alexander Wandl, MSC

Partner:
Ghent University
Faculty of Bioscience engineering
Department of Sustainable Organic Chemistry and Technology
- **WP4 leader**: Dr. Ir. Sue Ellen Taelman, Prof. Dr. Ir. Jo Dewulf

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